

*Ex-post analysis of Dutch hospital mergers*¹

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Summary

Ex-ante assessments of hospital mergers are complicated and often lead to a lot of discussion, particularly about defining the geographical market. Therefore, ex-post assessments of hospital mergers are gaining more attention. In this study, we perform an ex-post analysis of two mergers that involve Dutch hospitals: the merger of Ziekenhuis Hilversum and Ziekenhuis Gooi-Noord, and the merger of Erasmus MC ziekenhuis and Havenziekenhuis Rotterdam. We investigate whether or not the merging hospitals have used their increased market power to raise their prices for one specific type of treatment, i.e. hip surgery. Moreover, pre-merger and post-merger travel behavior of patients is also examined.

For the Ziekenhuis Hilversum – Ziekenhuis Gooi-Noord merger, we found a significant price increase, whereas for the Erasmus MC ziekenhuis – Havenziekenhuis Rotterdam merger, we did not find a significant price increase. For both mergers, travel behavior of patients prior and after the merger show no significant changes. The observed price increase combined with the unaltered travel behavior could be an indication that the competition authority has defined too small a geographical market for the merger of Ziekenhuis Hilversum and Ziekenhuis Gooi-Noord. However, more information is needed before any definite conclusions can be drawn, information such as investigation into additional types of treatments, additional information about quality, as well as additional qualitative research.

1 Introduction

There is a lot of attention for hospital mergers and for the assessment of these mergers by competition authorities. Ex-ante assessments of mergers are challenging due to specific features of hospital markets, such as the presence of third-party payers, differentiated products and asymmetric information. Despite these issues, most attention is given to the definition of the geographical market.

In the United States (U.S.), there have been over 900 hospital mergers during the period of 1995 – 2002. Competition authorities challenged only seven of these cases. In court, they lost all of these cases, and most of these losses were because of the definition of the geographical

market. The courts usually accepted the broad market definition that the parties put forward. Nevertheless, studies that performed ex-post assessments of hospital mergers showed that several hospital mergers did have anticompetitive effects. Moreover, in 2005, competition authorities challenged a hospital merger ex-post. In this case, the court accepted the limited geographical market put forward by the competition authorities. This was the first time since the 1980s that the courts ruled in the competition authorities' favor with regard to challenging a hospital merger (Varkevisser and Schut, 2008)⁴.

Since the gradual introduction of managed competition in the Dutch hospital market in 2004, the NMa has ex-ante assessed eight hospital mergers. Apart from an intended merger that was prematurely cancelled by the merging parties, the NMa approved all of the other mergers, mainly because there would be enough competition left on the market after each merger. Some of these decisions have led to a lively debate between policymakers, scholars, and politicians.⁵ The geographical market definition in particular turned out to be one of the focal points of this debate (Janssen et al., 2009). Unlike in the US, hospital mergers in the Netherlands have yet to be empirically investigated ex-post.

In this study, we perform an ex-post analysis of two mergers involving Dutch hospitals that were approved by the NMa: the Ziekenhuis Hilversum – Ziekenhuis Gooi-Noord merger⁶ (hereafter: Gooi-hospital merger) and Erasmus MC ziekenhuis – Havenziekenhuis Rotterdam⁷ (hereafter: Rotterdam-hospital merger). The former merger in particular was a controversial one and has led to much debate and discussion, whereas the latter merger has not led to any debate. In our analysis, we investigate whether or not the merging hospitals have used their increased market power to raise prices for hip surgery. Moreover, in order to gain a clearer understanding of what the actual geographical markets could have been, the travel behavior of patients is examined as well.

Section 2 provides an overview of the related literature. In Section 3, we describe the process of (hospital) merger control in the Netherlands, and the merger background. The methodology is described in Section 4, and Section 5 contains a description of the data. The results are discussed in Section 6, followed by the conclusions and discussion in Section 7.

2 Related literature

Ex-post evaluation of competition authorities' enforcement activities consists of comparing the effect of the outcome of either an antitrust intervention or antitrust abstention with the estimated effect of a counterfactual (alternative decision). These kinds of studies are often carried out by the authorities themselves (Van Sinderen and Kemp (2008). These studies have an internal and an external objective (Neven and Zenger, 2008). The external objective focuses on the substantive decisions of the competition authority: do the decisions contribute to its ultimate goal?⁸ Answers to this question could, for example, be used to improve future ex-ante assessment of mergers. The internal objective focuses on the improvement of the competition authority's internal procedures, i.e. using better managerial and organization techniques to increase the likelihood that decisions of the authority contribute to the ultimate goal (Kovacic, 2006).

Qualitative ex-post investigation is one of the methods that are used to investigate the price effect of mergers. For example, in Great Britain, the Office of Fair Trading (OFT), the Department of Trade and Industry (DTI) and the Competition Commission (CC) have commissioned PricewaterhouseCoopers (PwC) to perform an ex-post evaluation of mergers that had been approved by the CC between 1991 and 2002 (PwC, 2005). PwC concluded that there is effective competition in all of these cases at the moment of research, although in some cases there were some short-term competition concerns as a consequence of the merger. Recently, the OFT commissioned external researchers to conduct a review of eight merger decisions in the period of 2004-2006 (Deloitte, 2009). They concluded that, in most of the cases, post-merger market developments have not led to considerable concerns about the soundness of the decision.

In the Netherlands, ECORYS, commissioned by the Dutch Ministry of Economic Affairs, performed a qualitative ex-post analysis of ten case studies which included five merger cases (ECORYS, 2002). It concluded that in none of the four approved mergers (three with remedies) the level of competition had been negatively influenced. In the investigated blocked merger, it found ex-post that the level of competition would have been lower had the merger been approved.

According to Weinberg (2008), a quantitative analysis of prices pre-merger and post-merger is the most credible way of assessing the price effects of mergers. He surveyed 22 mergers in various sectors of the U.S. and showed that most of the mergers led to higher prices for the merging parties, at least in the short run. Most of these ex-post studies were conducted in sectors that were in three historically regulated industries where pricing data are publicly available: airlines, banking and hospitals (Pautler (2003), Ashenfelter and Hosken (2008)).

2.1 Ex-post evaluation of hospital mergers

There are many quantitative ex-post studies of mergers in the health care sector available, in part driven by the wide availability of data in this sector. Most ex-post evaluations of hospital mergers originate from the U.S, as competition in the health care sector is quite common there. In Europe on the other hand, for instance in Germany and the Netherlands, the health care sector is currently in a transition in order to become competitive in the future.⁹ Accordingly, in these countries, hospital mergers can be assessed ex-post since a couple of years now.

Until the beginning of the 2000s, most of the studies that investigated the effects of hospital mergers were variants of the structure-conduct-performance paradigm. In these studies, the correlation between market concentration and price is employed to assess a merger. Since the mid-1980s, the studies typically found a positive relationship between concentration and price (see e.g. Dranove et al., 1993, Pautler and Vita, 1994), suggesting that hospital mergers would lead to higher prices after the mergers have gone through. Although quite informative, these studies, however, did not reveal any direct evidence of the effects of mergers. Furthermore, the results of these studies depend heavily on the market definition, which in itself is very challenging (Varkevisser et al., 2008). Consequently, in these studies, inaccurate market definitions may have led to incorrect conclusions about the effects of mergers.

Since the 2000s, comparing pre-merger prices with post-merger prices has been the most common methodology, particularly using the difference-in-differences (DID) approach. One of the major advantages of this methodology is that it does not require any market definition. Accordingly, erroneous conclusions about the effect of a merger, as a consequence of inaccurately defining the market, are thus avoided. One of the first studies that employed this

methodology in the hospital sector is the work of Vita and Sacher (2001). Their analysis showed that the merger led to significant price increases (around 30 and 15 per cent). They also demonstrated that the change in cost did not provide a justification for the price increases, and that the market share of the merging hospitals in its relevant market has declined.

Connor et al. (1998) and Krishnan (2001) also used DID approaches to assess multiple hospital mergers ex-post. Connor et al. analyzed the change in total patient revenue for all of the 122 hospitals in the U.S. that merged during the period 1986-1994. They found a price decrease of 5 per cent for the merging hospitals relative to the control group of non-merging hospitals. They also analyzed costs, and found a decrease in costs of 5 per cent. The decrease in costs is converted into lower prices and the mergers have thus been pro-competitive. Krishnan (2001) examined 22 hospital mergers in Ohio and 15 hospital mergers in California. His analysis took place at the level of case (treatment) types and he showed that, for all case types, the price increase for the merging hospitals was higher than for the control group. Moreover, he demonstrated that the price increase is larger for the case types for which the merging hospital obtained a larger market share.

Recently, the Federal Trade Commission (FTC) produced three working papers that provide case studies of hospital mergers that took place in the beginning of the 2000s, using a DID approach. Tenn (2008) investigated the pre-merger prices and post-merger prices for one hospital merger, for three large insurers. He used control variables for observable hospital characteristics, like the type of hospital, the number of beds and the for-profit status of the hospital. One of the merging hospitals had relatively low pre-merger prices, while the other hospital had relatively high pre-merger prices. Post-merger, the prices converged to the higher price level. Regression analysis confirmed that the price change of the hospital with lower prices was significantly larger than the average price change, while the price change of the hospital with higher prices was not statistically different from the control group. This conclusion held for all insurers.

Haas-Wilson and Garmon (2009) investigated two hospital mergers. For the first merger, regression analysis showed that for four of the five managed-care organizations (MCOs), the price increase was large and significant.¹⁰ In the second merger, regression analysis showed a relative price decrease for three MCOs, a not-significant price increase for one MCO and a

significant price increase for another MCO. On average, there was a price increase of 4 per cent in the period 1999-2002.

Finally, the results of the evaluation of a hospital merger by Thompson (2009) were mixed. Regression analysis demonstrated that some insurers experienced a significant price increase (> 50 per cent), one insurer had a significant price decrease (-29 per cent), whereas for the others the price increase was the same as for the control group.

The results of the discussed studies are mixed: price increases, price decreases, as well as stable prices. In particular, these different results become visible when studying at the hospital-insurer level. Therefore, the conclusions cannot be easily generalized, and the results may even depend on the specific circumstances of a hospital merger. Next to that, it should be noted that the hospitals that have been investigated are not a random sample of all of the mergers that took place. Therefore, Carlton (2007) is in strong favor of systematical and quantitative analyses of all mergers, or of a sample thereof, as he argues that a mistake in one case could be a random error and would not necessarily have to point at a systematic error in the policy. Finally, the institutional framework of a country with respect to the health care sector plays an important role as well.

3 Ex-ante assessment of hospital mergers in the Netherlands

The NMa, established in 1998, enforces fair competition in all sectors of the Dutch economy. A part of its responsibility is ex-ante assessment of mergers. During the period of 1998-2003, before the major reforms in the health care sector had been introduced, the NMa was already asked to assess several hospital mergers. The conclusion of the subsequent investigations by the NMa was that actual competition between hospitals was not yet possible due to price and supply regulation (Varkevisser et al., 2008). Therefore, the NMa decided to approve these hospital mergers without carrying out substantive assessments.

However, in 2004, after extensive investigations, the NMa concluded that, given the legislation at that time, hospitals could compete with respect to quality, service and supply.¹¹ From then onwards, the NMa started to assess hospital mergers with respect to the content.

The NMa has assessed eight hospital mergers since 2004.¹² In most cases, the merging hospitals were close competitors in a geographical sense. Except for an intended merger that was prematurely cancelled by the merging parties, the NMa approved all of these mergers, primarily because of the fact that there would be enough competition left on the market after the merger.¹³ In the assessment of hospital mergers, the definition of the relevant product and of the geographical market are central issues.

3.1 Product market definition

In all relevant merger cases¹⁴, the NMa has considered inpatient care and outpatient care as two separate product markets in all hospital merger cases.¹⁵ One reason for this distinction is that both supply substitution and demand substitution can be different for inpatient and outpatient care. Blank and Van Hulst (2005) confirm this observation for the supply substitution. Moreover, competition circumstances differ, since independent treatment centers are only allowed to supply outpatient hospital care. Also, in the United States and in New Zealand, inpatient care and outpatient care are considered to be two separate product markets in hospital merger control. There is no public debate about this product market delineation. In contrast, a geographical market definition in hospital merger cases is more challenging.

3.2 Geographical market definition

For hospital mergers, geographical market definitions are exceptionally challenging, since the normal tests that are applied to define markets are not useful. This is due to the specific characteristics of hospital markets, namely the presence of third-party payers, differentiated products, asymmetric information, uncertainty, and entry and exit barriers (Varkevisser and Schut, 2008).

Normally, competition authorities use the standard ‘Small but Significant Non-transitory Increase in Price’ (SSNIP) test in order to define the relevant geographical market. A SSNIP market is a group of products for which there are no close substitutes outside the group, but for which there are good substitutes within the group (Gaynor and Vogt, 2007). There are two main problems with the application of the SSNIP test in hospital markets. The first problem is that, in the non-competitive segment, price is no competition parameter, since prices are regulated. Second, the prices in the competitive segment do not have to be paid by the patients themselves, since all patients have mandatory insurance. Therefore, patients are not price-

sensitive. Due to these problems, price elasticity of demand of the hospital cannot be calculated. There are various alternatives for the SSNIP test that can be used to define the geographical markets in hospital merger cases. We will further examine the Elzinga Hogarty (EH) test, since this test is commonly used by competition authorities worldwide, including those in the U.S., Germany and the Netherlands.¹⁶ Moreover, the NMa used the EH test in the ex-ante assessments of the two hospital mergers that are investigated in this paper.

The EH test is a shipment-based approach to geographical market definition and is based on historical patient-flow data. The rationale behind the method is that if a certain geographic area is the supposed relevant market, there is little export of hospital services (consumers outside the relevant market do not make use of many hospital services from within the relevant market, LOFI, little in from outside) and there is little import of hospital services (consumers within the relevant market do not make use of many hospital services from outside the relevant market, LIFO, little out from inside). The test starts with a narrowly defined market, and that market is enlarged until the thresholds are met. If both LIFO and LOFI are at least 75 per cent, Elzinga and Hogarty consider such a market to be a ‘weak’ market and if both LIFO and LOFI are at least 90 per cent, they define such a market as a ‘strong’ market.

Although the EH test is transparent and easy to understand, it also has some important shortcomings (Frech III et al., 2004). First of all, it is a static test: it uses patient-flow data pre-merger to conclude what will happen post-merger. But current behavior is not necessarily a correct measure of future behavior – particularly not for sectors that are in a transition, like the health care sector in the Netherlands. Furthermore, the threshold values of 75 and 90 per cent are chosen arbitrarily. Next to that, heterogeneity of the patients in the geographic area could lead to markets that are too broadly defined: this problem is called ‘silent majority fallacy’. If a certain subgroup of patients is willing to travel to a more distant hospital, this does not automatically mean that this holds true for the whole population. Hence, the existence of such a subgroup is no reason to define the geographical market broader. In other words, the presence of a group of patients that travels to more distant hospitals does not discipline merging hospitals from abusing its increased market power, since there is a non-traveling silent majority (Varkevisser et al., 2008). The results are also sensitive to alternative implementations of the EH test (Frech III et al., 2004). Finally, the EH test can lead to either

too large a geographical market, in case of horizontally differentiated products, or too small a geographical market, in case of very close substitutes.¹⁷

As a consequence, the EH-test is considered to be unreliable in defining the relevant geographical hospital markets. Therefore, most of the time, the EH test is used in combination with other techniques for market definitions. However, all other methods have their pros and cons, and therefore, there is no ideal method. This makes market definition in hospital markets very challenging.

3.3 Merger Background

In this Section, we describe the institutional framework of the Dutch health care sector, since it is important to take this into account when performing ex-ante and ex-post assessments of hospital mergers. Then, the two mergers under investigation are described.

3.3.1 Reforms in the Dutch health care system

During the last five years, a number of major reforms have taken place in the Dutch health care sector. These reforms' objectives are to keep health care affordable and of high quality. This is done by a gradual introduction of a system of managed competition.

With regard to hospitals, the first steps are the introduction of a system of so-called diagnosis-treatment combinations (DBC's), as well as the introduction of a competitive segment of hospital care. A DBC describes the care for a patient in four codes: care question, care type, diagnosis and treatment. In this way, a DBC is the entire treatment process a patient goes through, from the first appointment to the last check. The DBC diagnosis codes are coupled to the international ICD10-codes. The DBC system was introduced in 2005, and it forms a univocal negotiation and declaration language: DBC's are the same in all Dutch hospitals and can be seen as relatively homogeneous treatments. For a carefully selected small group of DBC's, namely DBC's that deal with uncomplicated, elective (non-acute) outpatient hospital care, prices, quantities and quality have become subject to bargaining between insurers and hospitals. This competitive segment of hospital care is called the B-segment. All other treatments are part of the non-competitive segment (A-segment). In 2005, 8 per cent of the

hospital care is part of the competitive segment. The competitive segment expanded to 20 per cent of the hospital care in 2008 and to 34 per cent in 2009.¹⁸

Moreover, in 2006, the Netherlands Healthcare Authority (NZa) was established, which is the sector-specific regulator for all health care markets in the Netherlands. The NZa promotes quality, attainability and affordability in the health care sector and provides the NMa with opinions in hospital merger cases with respect to these three aspects of health care.¹⁹ Since January 1st, 2006, the new Health Insurance Act has been in effect. Thereunder, all residents of the Netherlands are legally required to take out health care insurance and to get at least a basic health insurance package. This package consists of primary medical and hospital care. What this package covers is the same for each resident, although the fee can differ per insurer. Health care insurers are required to accept all applicants for the basic package, and they have to charge the same price to each insured person. As a result, price discrimination and risk selection are not allowed. The hospitals are not allowed to refuse patients.

3.3.2 The cases

In this study, the price effect of two Dutch hospital mergers is investigated: the Gooi hospital merger and the Rotterdam hospital merger. We chose these two mergers because they were finalized at around the same time in 2005. Moreover, it is interesting to compare the two mergers: the decision to approve the Gooi hospital merger has led to much debate and criticism, whereas the decision in the Rotterdam hospital merger was hardly an issue.

In the Gooi hospital merger, both hospitals are of comparable size. In the first-phase investigation, the NMa used the EH test to define the relevant geographical market. The EH test pointed at a small geographical market in which the combined market share of the two hospitals was high. More extensive studies in the second-phase investigation on the relevant geographical market, with a more dynamic character and more focused on the patients' willingness to travel, did not lead to a univocal picture. Due to these ambiguous results and given that the hospital market was in transition, whereby the availability of transparent information on quality was expected to increase in the near future, the NMa decided that there were 'insufficient grounds' for defining a small geographical market. In the broader geographical market, the combined market shares of the merging parties would be low.

Therefore, the NMa approved the merger. This decision led to a lot of debate and criticism from policymakers, scholars and politicians (see e.g. Janssen et al., 2009). The focus of the debate was the geographical market definition. According to these critics, the NMa should, in case of doubt, have chosen for the smaller geographical market instead of for the larger geographical market²⁰.

In the Rotterdam hospital merger, two hospitals of different size wanted to merge. The EH test showed that the LOFI and LIFO scores were below 80 per cent for the zip code areas in which the hospitals are located. This is an indication that the geographical market would probably be larger than this area. In the end, the NMa has not defined the relevant market in detail. Even for the smallest possible geographical market, it was not likely that the merger would lead to the creation or to a strengthening of a dominant position, since there would be sufficient competition left on the market.

4 Methodology

In this Section, the methodology that is applied to estimate the effect of the two mergers on prices is described. We use the commonly used difference-in-differences (DID) approach, which is based on a ‘before-after’ comparison (Hunter et al., 2008). This method is also used in previous studies on the price effect of hospital mergers (Tenn, 2008, Thompson, 2009). In order to distinguish the effect of the mergers, it is necessary to control for other observable economic factors that can cause a price change, such as hospital size and the competition circumstances.

Unobservable economic factors, like technological developments and changes in the regulatory framework are also controlled for in the DID approach. We include other hospitals in other geographic areas in the regression, in which the price is affected by the same unobservable economic factors, but not by the merger. The assumption is that the merging hospitals are, for example, influenced by the regulatory reforms to the same degree as the other hospitals in the Netherlands are.

Typically, ex-post merger studies use a model of the form (Tenn, 2008):

$$\ln p_i = X_i\beta + \gamma_h + \alpha PostMerger_i + \theta(PostMerger_i * M_i) + \omega_i \quad (1)$$

The dependent variable p_i is the price for individual i , X_i represents the set of patient characteristics and γ_h is the fixed effect for hospital h . The variable $PostMerger_i$ is a dummy variable that has value one if a patient enters a hospital in the post merger period. Dummy variable M_i is equal to one if the hospital is one of the merging hospitals. The coefficient θ is the DID parameter and reflects the difference between the price change of the merging hospitals and the price change of the control group, after controlling for the observable characteristics (X).

Tenn (2008) and Thompson (2009) use a two-step approach to avoid downward-biased standard errors (Bertrand et al., 2004). In the first stage, the average price change for each hospital is estimated, while controlling for hospital and patient characteristics. In the second stage, the difference between the price change of the merging hospitals and the price change of the control group is estimated. In our analysis, we can aggregate the patients' level data to insurer-hospital level data without a loss of information as the prices are the same for all patients that have the same insurer and that enter the same hospital. Therefore, it is not necessary to control for patient characteristics, as our level of analysis is the hospital-insurer level.²¹

We determine the price effect of the merger after controlling for hospital characteristics. In other words, an OLS regression will be performed to control for both the observable hospital characteristics by means of including these in the regression model and the unobservable hospital characteristics by means of including a control group²².

So we estimate a model of the form:²³

$$\Delta p_{hi} = \alpha + \beta X_h + \gamma I_i + \phi M_{hi} + \varepsilon_{hi} \quad (2)$$

where, Δp_{hi} is the price change per hospital-insurer combination, α is the constant, X_h reflects the observable hospital characteristics and I_i is an insurer fixed effect for insurer i . The

coefficient ϕ is the DID parameter and M_{hi} is a dummy variable that is equal to one if hospital h_i is one of the merging hospitals.

5 Data

The analysis is based on a unique NZa data set of treatment, prices, quantities and patient characteristics for all hospitals in the Netherlands. The analysis is done for hip surgery in the competitive segment, and for one specific disorder in particular, i.e. the abrasion of the hip, arthrosis. This is a disorder that is very common among seniors and is a homogeneous treatment. Other closely-related treatments have DBC-codes. The treatment includes more than 95 per cent of total hip treatments in the competitive segment in the period of investigation. We concentrate on this treatment because hip treatments have a large share of the total revenue in the competitive segment of hospital care in the Netherlands (20 per cent in 2005).²⁴ Furthermore, hip surgery is performed in almost all hospitals in the Netherlands, so a large control group can be constructed. Finally, hip surgery is typically performed in hospitals and not in independent treatment centers.²⁵

The level of analysis is the hospital-insurer combination level, since prices are the same for all patients that have the same insurer and enter the same hospital. We focus on two years: the year before the merger took place (2005) and the year after the merger had been finalized (2007).²⁶ The dependent variable in our analysis is the price increase between 2005 and 2007, as a percentage of the price in 2005.

The control group consists of all other hospitals in the Netherlands that perform hip surgery in both 2005 and 2007. In total, we have 387 observations, of which 27 are related to one of the two mergers. We control for observable differences between the hospitals by including several control variables (see Table 1).²⁷ The variables for which no source is mentioned are obtained from the NZa.

Table 1 about here

Type of hospital, Number of beds and Change in number of medicals specialists control for the influence that the type and size of hospitals may have on prices. For example, academic

hospitals and medical teaching hospitals may have a higher expertise and quality, which can lead to higher price increases. The number of beds indicates the size of the hospital. A change in the number of medical specialists demonstrates to what extent the hospitals have grown during this period.²⁸

Change of outpatient cases and Orthopedists control for the focus and expertise of the hospital with respect to the competitive segment in general and to hip surgery in particular. The change of outpatient cases shows to what extent hospitals focus on the competitive segment, relative to the non-competitive segment during this period.²⁹ Orthopedics is the medical specialism that deals with hip surgery. An increase of the number of orthopedists may imply, for example, lower price increases (economies of scale), or higher price increases (more expertise and higher quality).

The variables Regions and Urbanization control for the area in which the hospital is active, as prices may differ per region in the Netherlands. HHI hospital market³⁰, HHI insurers and the nearness of an independent treatment centre control for the competition and negotiation circumstances. A higher HHI of the hospital market can lead to higher price increases, since hospitals can use their market power. A higher HHI of insurers can lead to lower price increases, due to stronger bargaining power of insurers. Fierce competition in the market, e.g. as the result of the nearness of an independent treatment centre, can lead to lower price increases as well.

Finally, we control for quality developments. Increased quality may lead to higher price increases, while decreased quality may lead to lower price increases. Quality is measured by the change of the score in the annual survey of Dutch newspaper *Algemeen Dagblad* (AD) on quality, which consists of twenty six quality indicators that are formulated by, amongst others, the Netherlands Health Care Inspectorate (IGZ).³¹ Examples of these quality indicators are undernourishment, pain after surgery, cancelled operations and patient satisfaction.³²

6 Results

6.1 Price development

Figure 1 shows the average price increase for the Netherlands and for the merging hospitals, between 2005 and 2007, per insurer.³³

Figure 1 about here

For the Netherlands, there is an average price increase that varies between 0.2 and 3.9 per cent. For hospital 1, there is a price increase for all insurers (approximately 10 per cent), except for insurer 5, for which there is a price decrease of 1.4 per cent. For hospital 2, there is a price increase for all insurers between 5 and 10.5 per cent. Hospital 3 has a fixed price increase for all insurers of 2.4 per cent, for hospital 4, the price increase is between 1.7 and 4.6 per cent. The weighted average price increase in the Netherlands is 2.5 per cent, the weighted average price increase for hospital 1 is 3.6 per cent, for hospital 2 7.1 per cent, for hospital 3 2.4 per cent and for hospital 4 3.0 per cent.

6.2 Pre-merger and post-merger prices in comparison to the national average

For the controversial merger, there are substantial price increases for this specific treatment, compared to the average price increase in the Netherlands. In order to put this price increase in a wider perspective, we compare the absolute price of each merging hospital in 2005 to the national average price, per insurer (see Table 2). The national average price is set at 100.

Table 2 about here

In 2005, for Ziekenhuis Gooi-Noord and Ziekenhuis Hilversum, most prices were below the national average. In 2007, these merging hospitals use one uniform price, which, in most cases, is above the national average in 2007. So between 2005 and 2007, the prices of the merging hospital have, on average, changed from below the national average into above the national average level, except for insurer E, which is the largest insurer in the region (market share > 50 per cent). This may be a sign that negotiation power is effective here.

For the Rotterdam merger, both hospitals use their own price after the merger. For Havenziekenhuis Rotterdam, the prices were above the national average in 2005. In 2007, its prices were again above the national average with approximately about the same percentages as in 2005. For Erasmus MC ziekenhuis in 2005, the prices were around the national average for insurer A, B and D. For insurer G and H, the prices were above the national average. After the merger, this pattern does not change much. So for this merger, the price development is in line with the average price development in the Netherlands.

6.3 Regression analysis for the two mergers simultaneously

In this section, we perform a regression analysis in which we control for the relevant economic factors. We have estimated equation (2) for both mergers simultaneously (see Table 3)³⁴.

Table 3 about here

Several control variables are statistically significant. The number of beds is statistically significant and positive, indicating that the larger the number of beds, the higher the price increase. All variables that control for the location of the hospitals (urbanization and dummies for the regions) are statistically significant. The price increases are higher in rural areas. A reason for this could be that there is less competition in rural areas. Price increases also vary between regions in the Netherlands.

Moreover, the number of outpatient cases appears to be statistically significant and positive. Apparently, an increased focus on the competitive segment leads to higher price increases for hip surgery. A possible explanation is that, as a consequence of a more specific competition strategy in the period under investigation, these hospitals may have higher capacity for treatments in the competitive segment. As a result, these hospitals have shorter waiting lists and can achieve higher price increases.

The Δ HHI insurers and the nearness of an independent treatment centre both have a statistically significant negative effect on the price increase. This matches our expectations, since this leads respectively to a worse negotiation position and fiercer competition for

hospitals. The own HHI of hospitals is also significant and has a negative sign. Although the coefficient is small, this is an unexpected result. A possible explanation is that a hospital in a high HHI market has to compete with one or more large hospitals. This means that fierce competition may explain the negative price increases. The price increase also differs per insurer, as several insurer dummies are statistically significant.

The dummy variables for Ziekenhuis Gooi-Noord and Ziekenhuis Hilversum are significant. This means that the effect of the Gooi hospital merger is statistically significant and positive. The regression analysis shows that, even if we control for other economic factors that can cause a price increase, price increases of 3.5 per cent for Ziekenhuis Gooi-Noord and 5.1 per cent for Ziekenhuis Hilversum can be attributed to the merger³⁵.

The dummy variables for the Havenziekenhuis Rotterdam and the Erasmus MC ziekenhuis are both statistically insignificant³⁶. This matches our expectations, since there is no price increase that deviates considerably from the national average for this Rotterdam merger.

6.4 Analysis of travel behavior of patients

In this section, the aim is to link the price effect of the mergers with the travel behavior of patients.

For the Gooi hospital merger, the NMa chose for a broader geographical market in its decision to approve this merger.³⁷ If this is the correct market definition, one would expect to see a change in travel behavior as a consequence of the increase in prices. In other words, one would expect that some patients that went to the merging hospitals pre-merger, went to other hospitals in the broader geographical market post-merger, in order to avoid the price increase.³⁸ With the purpose of testing this hypothesis, an additional analysis is performed. We have calculated the average travel time of patients that have undergone hip surgery in one of the merging hospitals (see Table 4).

Table 4 about here

The results indicate that although the average travel time to the merging hospitals has changed only slightly, it has not changed significantly during this period. Furthermore, the number of

surgeries that the Gooi hospital merging hospitals have performed decreased during this period, while its market share in the small relevant market increased with 3 per cent.³⁹ This indicates that less people from outside the small relevant market have come to the merging hospitals. This indicates that the actual relevant market may have been smaller. Namely, if the market would have been larger, also patients in the smaller market would have gone to another hospital in order to avoid the price increase, instead of bearing the price increase. For the Rotterdam hospital merger, we do not expect to find a change in travel behavior in the post merger period. The average travel time did also slightly change, but not significantly during this period.

7 Conclusions and discussion

7.1 Conclusions

In this paper, we have investigated the price effect of two hospital mergers in the Netherlands. We focused on one specific treatment, hip surgery. The results were quite appealing: for the Gooi hospital merger, we observed a substantial price increase. Part of this price increase may be explained by the fact that the prices were below the national average before the merger. But this does not explain why the prices are well above the national average post-merger. For the Rotterdam hospital merger, we did not find a statistically significant price increase. In addition, for both mergers we found that the travel time did not significantly change after the merger. In the Gooi hospital merger, the patients did not react to the price increase by choosing another hospital. This may indicate that the relevant geographical market as defined by the NMa may have been smaller than assumed. Namely, if the relevant market would have been larger, patients would have travelled to other hospitals within the relevant market in order to avoid the price increase, instead of bearing the price increase. In the large relevant market, the price increase would not have been profitable. In the small relevant market, it apparently was.

The decision is partially based on the expectation that patients would travel if prices would increase. In hindsight, we see that patients did not change their travel behavior in both mergers. This result underlines the observation that is seen more often in the Netherlands: patients do not travel to distant hospitals.⁴⁰ Patients tend to go to a hospital that is located

close to their homes. This result points out that the NMa should be cautious if it bases a decision on the expectation that patients are going to travel in the future.

However, it is possible that patients are going to travel in the future, when quality becomes more transparent and selective contracting and channeling by insurers becomes common practice. We further examine both of these developments. At the moment, quality is not yet transparent in the Netherlands, since it is very difficult to measure. The quality measure is not significant in the regression either. Currently, there are a number of attempts to make more information available on quality, and especially on the quality of specific treatments.⁴¹ Moreover, the Netherlands Health Care Inspectorate has started a project, called *Zichtbare Zorg*, which, within a couple of years, has to lead to a uniform set of quality information that is useful for consumers.

Nowadays, most insurers have contracts with almost all hospitals in the Netherlands. Moreover, most patients can choose any hospital they want, as insurers virtually do not channel patients to hospitals that they prefer out of price or quality motives. Our results indicate that channeling by insurers has indeed not taken place in the period of study. If channeling would have taken place, patients within the smaller geographical market would have been channeled to hospitals outside the smaller geographical market and the market share of the merging hospital in the smaller market would have gone down. But there are signs that selective contracting is possible and that channeling will take place in the future. One insurer already introduced such an insurance package, and, according to a survey of the NZa, 52 per cent of health care insurers indicated that they pay ‘much more’ or ‘more’ attention to channeling in 2009, relative to the year before.⁴² Furthermore, the possibility alone to channel patients will give insurers more bargaining power in their negotiations with the hospitals.

7.2 Discussion and future research

Just like the results of some recent studies of the FTC, the results of this study show that there is a substantial post-merger price increase that can be attributed to the merger. However, it is important to be careful when drawing conclusions. First of all, the mergers took place one year after a major market reform, i.e. the introduction of competition in the health care sector.

At least a part of the price increase may be explained by the fact that the prices of the merging hospitals were below the national average before the merger, i.e. a learning effect. For some hospitals, it took a few years after the opening of the market before the negotiators were used to the bargaining process for the competitive segment. High price increases can accordingly indicate improved negotiation skills. The price increase could also be explained by an increase in quality, although our quality indicator is not significant in the regression. Recently, the NMa approved a hospital merger with remedies.⁴³ These remedies imply, among other things, a price cap for the merging hospitals. So, for this recent merger, possible quality improvements or improved negotiation skills can by no means be paired with price increases that raise anti-competitive doubts.

In addition, it is important to be aware of the limitations of this study. First of all, we have focused on only one type of surgery: we did not take into account all other treatments in the competitive segment. Investigating the price change of all treatments in the competitive segment may provide a different picture. It is, for example, quite common that insurers and hospitals agree on a total budget that hospitals annually receive. Within this budget, the amounts of funds that are allocated to treatments can be somewhat arbitrary: for some treatment, a relatively high price can be agreed on, while for other treatments, a relatively low price can be agreed on. Secondly, as long as quality is not transparent, it is hard to draw any conclusions from a price increase. A price increase may (partially) be justified by a quality increase (Argue, 2009).

Moreover, in order to interpret the results of a study that only investigates quantitative information, like this study, it is worthwhile to perform complementary qualitative research. This qualitative research can, for example, consist of interviews with the involved hospitals, insurers, patients and other stakeholders. The combination of quantitative and qualitative information will provide the most insight into what really happened after the finalization of a merger. For future research, we suggest that this combined research could be done for this merger and preferably systematically for all Dutch hospital mergers, like Carlton (2007) already recommended.

Finally, in this study, we mainly investigated the price-effect of the merger. In order to evaluate the decision of the NMa, it is necessary to go into detail in the original case and the

original decision of the NMa. To be more precise, it is important to find out which information was or could have been available at the moment of the decision. Based on that, it can be determined whether or not the NMa made a type 2 error in approving the Gooi hospital merger.

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Figure 1 Average price increase in the Netherlands and the merging hospitals, per insurer

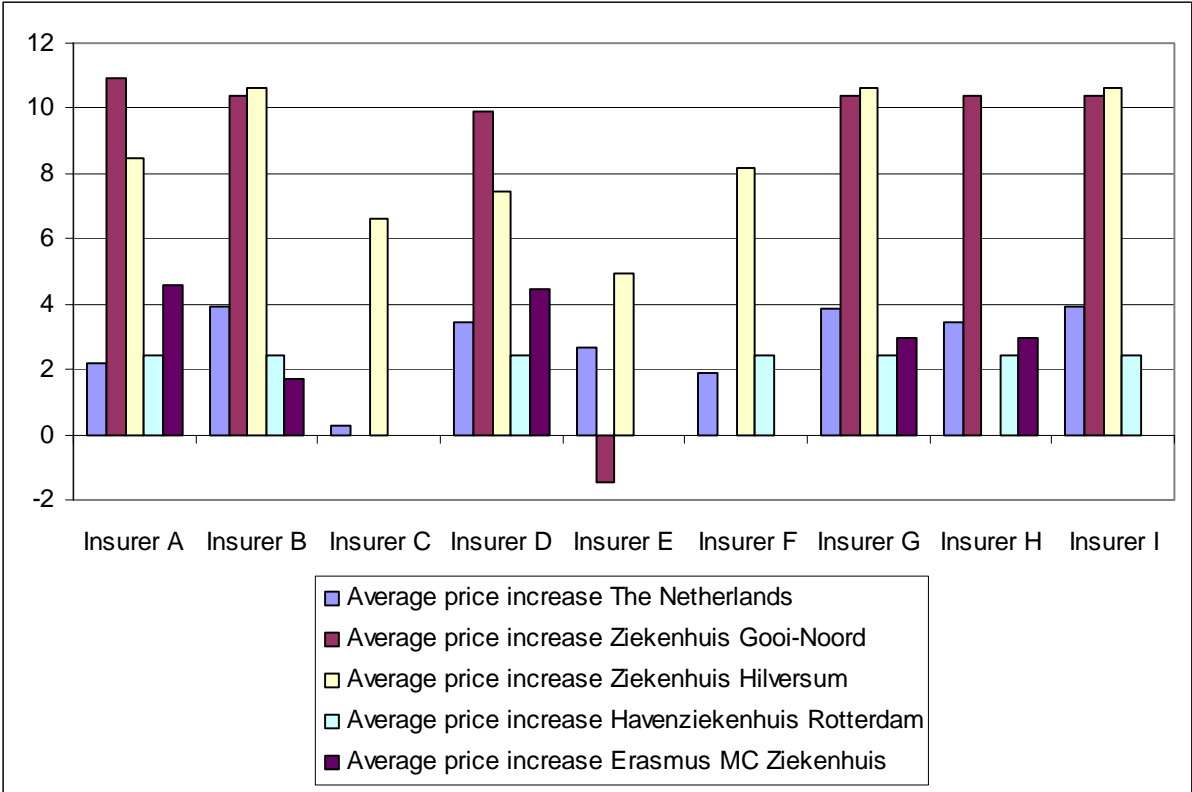


Table 1 Control variables for observable hospital characteristics

<i>Control variable</i>	<i>Description</i>
Type of hospital	A dummy variable for a general hospital, medical teaching (topklinisch) hospital or academic hospital
Number of beds	The number of beds (absolute value)
Δ Medical specialists	Change in the number of medical specialists working in the hospital
Δ Outpatient cases	Change in the number of outpatient cases in the hospital
Δ Orthopedists	Change in the number of orthopedists working in the hospital
Urbanization	The extent to which the area in which the hospital is located is urbanized (scale of 1 to 5; 1 is most urbanized)
Region¹	A dummy variable for the region in which the hospital is located (north, east, south, west)
Δ HHI insurers²	Change in the HHI of insurers, per province
HHI hospital market	The HHI of its relevant market, per hospital
Independent treatment centre	The extent to which a independent treatment centre is located nearby (scale of 1 to 3; 1 is most nearby located)
Δ Quality AD³	Change in the yearly Algemeen Dagblad (AD, a Dutch newspaper) survey on hospital quality

¹ This information is obtained from Statistics Netherlands (www.cbs.nl)

² This information is obtained from *Monitor Zorgverzekeringsmarkt 2008*, by NZa.

³ This information is obtained from Algemeen Dagblad, AD Ziekenhuis Top 100 (www.ad.nl/ziekenhuistop100)

Table 2 Price index of merging hospitals, pre and post merger, per insurer

	National average 2005	National average 2007	Gooi Merger		Rotterdam Merger				
			Ziekenhuis Noord pre merger	Ziekenhuis Hilversum pre merger	Gooi hospital merger post merger	Haven-ziekenhuis Rotterdam pre merger	Erasmus MC Ziekenhuis pre merger	Haven-ziekenhuis Rotterdam post merger	Erasmus MC Ziekenhuis post merger
Insurer A	100	102.2	96.4	98.6	106.9	103.4	99.6	105.9	104.1
Insurer B	100	103.9	98.7	98.5	109.0	104.9	100.0	107.4	101.7
Insurer C	100	100.1		95.1	101.4				
Insurer D	100	103.4	96.0	98.2	105.6	103.1	99.2	105.5	103.6
Insurer E	100	102.6	102.9	96.7	101.4				
Insurer F	100	101.7		97.1	105.1	101.1		103.5	
Insurer G	100	103.9	97.7	97.5	107.8	103.8	104.3	106.3	107.4
Insurer H	100	103.4	97.4		107.5	103.5	104.0	106.0	107.1
Insurer I	100	103.9	98.0	97.8	108.1	104.1		106.6	

Table 3 Regression analysis for the two mergers simultaneously

<i>Relative price increase</i>	<i>Coef.</i>	<i>Std.Err</i>	
General hospital	0.754	0.791	
Medical teaching hospital	0.076	0.724	
Number of beds	0.001	0.001	*
Urbanization	0.755	0.268	***
Dummy region 2	-1.928	1.145	*
Dummy region 3	2.588	0.585	***
Dummy region 4	-2.011	0.858	**
Δ Medical specialists	-0.002	0.054	
Δ Orthopedists	0.149	0.369	
Δ Outpatient cases	0.157	0.041	***
Δ HHI insurers	-0.002	0.001	***
Δ Quality AD	0.021	0.018	
Independent treatment centre	-1.779	0.595	***
HHI relevant market	-0.000	0.000	***
Insurer A	-1.641	0.507	***
Insurer C	-3.231	0.780	***
Insurer D	-0.297	0.503	
Insurer E	-1.102	0.560	**
Insurer F	-1.748	0.567	***
Insurer G	-0.624	0.747	
Insurer H	-0.308	0.533	
Insurer I	-0.174	0.638	
Dummy Ziekenhuis Gooi-Noord	3.500	1.243	***
Dummy Ziekenhuis Hilversum	5.130	1.055	***
Dummy Havenziekenhuis Rotterdam	-0.278	1.139	
Dummy Erasmus MC Ziekenhuis	-0.629	1.424	
Constant	4.673	2.396	*
R ²	0.3486		
N	387		

Note: Significance levels are defined as * = 10%, ** = 5% and *** = 1%.

Table 4 Average travel time

	2005	2007
Ziekenhuis Gooi-Noord	16.32	
Ziekenhuis Hilversum	17.33	
Hospital Gooi hospital merger		18.57
Havenziekenhuis Rotterdam	14.29	16.63
Erasmus MC Ziekenhuis	23.04	24.98

Appendix

Table 5 Regression analysis Gooi hospital merger, per insurer

<i>Relative price increase</i>	<i>Insurer A</i>		<i>Insurer B</i>		<i>Insurer D</i>		<i>Insurer H</i>		
	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>	<i>Coef.</i>	<i>Std. Err.</i>	
General hospital	-0.171	1.795	1.034	1.494	-0.320	1.584	3.090	1.281	**
Medical teaching hospital	-0.628	1.508	1.879	1.372	-0.328	1.374	2.780	1.045	**
Number of beds	0.001	0.001	0.000	0.001	0.002	0.002	0.001	0.001	
Urbanization	-0.214	0.692	0.835	0.444	* 1.770	0.628	*** 0.440	0.416	
Dummy region 2	0.369	3.616	-6.648	2.149	*** -2.106	2.846	-4.059	2.128	*
Dummy region 3	0.309	1.426	-0.141	1.135	3.386	1.366	** -1.519	1.397	
Dummy region 4	-6.308	2.394	** -4.553	1.662	*** -3.662	2.020	* -3.438	1.885	*
Δ Medical specialists	-0.128	0.131	-0.006	0.110	-0.104	0.117	0.154	0.109	
Δ Orthopedists	0.823	0.911	0.454	0.784	-0.176	0.938	-0.761	0.596	
Δ Outpatient cases	0.155	0.098	0.102	0.075	0.120	0.095	0.224	0.067	***
Δ HHI insurers	-0.001	0.001	0.001	0.001	-0.004	0.001	*** -0.003	0.001	**
Δ Quality AD	0.055	0.046	0.025	0.036	0.018	0.042	0.006	0.030	
Indep. treatment centre	-1.295	1.837	-3.358	1.152	*** -2.238	1.423	-3.811	1.085	***
HHI relevant market	-0.000	.000	-0.000	0.000	** -0.000	0.000	-0.000	0.000	**
Dummy Ziekenhuis Gooi-Noord	8.802	3.174	*** 4.329	2.413	* 2.652	2.946	6.340	1.908	***
Dummy Ziekenhuis Hilversum	6.004	2.813	** 6.233	2.253	*** 3.628	2.633	(dropped)		
Constant	5.997	6.403	11.375	4.627	** 4.072	5.327	9.766	4.342	**
R ²	0.583		0.519		0.505		0.655		
N	60		61		62		50		

Note: significance levels are defined as * = 10%, ** = 5% and *** = 1%.

Endnotes

¹ We would like to thank the Dutch Health Authority for giving access to the data. We thank Jarig van Sinderen, Ilaria Mosca, Rein Halbersma, Willem Kerstholt, Krijn Schep, Gerard la Bastide, Frank Pellikaan, Tako Vermeulen, Dennis Fok, the participants of the symposium on the Ex-post Evaluation of Competition Policy in Mannheim (2009) and two anonymous reviewers for their useful comments and suggestions.

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⁴ This case is FTC – Evanston Northwestern Healthcare Corporation, No. 9315 (FTC May 17, 2005).

⁵ See for example a special issue of the journal *Markt & Mededinging*, No. 2: April 2009, that was entirely devoted to competition in the health care sector. Other examples are Kalbfleisch (2009), Reerink (2009), Canoy (2008) and Van Sinderen (2008).

⁶ See http://www.nmanet.nl/engels/home/News_and_publications/News_and_press_releases/2005/05_17.asp

⁷ See http://www.nmanet.nl/nederlands/home/Besluiten/Besluiten_2005/5047BCM.asp (in Dutch)

⁸ The ultimate goal of competition enforcement in the EU and in the Netherlands is to protect consumer welfare (Buccirossi et al., 2006).

⁹ Comparatively speaking, Germany is a bit further with respect to the introduction of competition in the health care sector than the Netherlands.

¹⁰ A MCO is a health organization that finances and delivers health care using a specific provider network and specific services and products.

¹¹ After the introduction of the competitive segment in 2005, competition also became possible with respect to price.

¹² For more extensive descriptions of the cases, see for example Janssen et al. (2009).

¹³ Recently, the parties of the withdrawn merger applied again for a license to merge and this time, the merger was approved with remedies (Besluit 6424/ Ziekenhuis Walcheren – Oosterscheldeziekenhuizen, 25th March 2009).

¹⁴ Besluit 3524/Juliana Kinderziekenhuis/Rode Kruis Ziekenhuis – Ziekenhuis Leyenburg, 28th January 2004, points 46-48

¹⁵ Inpatient care concerns treatments whereby patients are admitted to a hospital for more than 24 hours; outpatient care concerns treatments whereby patients are admitted to a hospital for 24 hours or less.

¹⁶ There are other alternatives for the SSNIP test, under which the critical loss analysis, the time-elasticity approach, the competitor share approach, the LOCI and the option-demand approach. See Varkevisser et al. (2008) and Halbersma et al. (2009) for extensive descriptions of these methods. Competition authorities also make use of analyses of travel time for market definition.

¹⁷ For a more extensive description of the EH test, see for example Gaynor and Vogt (2007).

¹⁸ Monitor Ziekenhuiszorg 2008, by NZa.

¹⁹ Before the establishment of the NZa, its predecessor, the College Tarieven Gezondheidszorg, advised the NMa on these aspects.

²⁰ This is a discussion about Type I and Type II errors. The policy of the NMa appears to be concentrated on the avoidance of Type I errors: to prohibit a merger that would actually be pro-competitive. In the US and Germany the policies appear to be more focussed on the avoidance of type II errors: avoiding approving a merger that would actually be anticompetitive.

²¹ In contrast, Tenn (2008) and Thompson (2009) do need to control for patient characteristics, like age, sex and type of insurance. This is due to the differences between the American health insurance system and the Dutch system. We have also employed an analysis in which we corrected the actual prices for patient characteristics (age and sex), but the results were not different from the results reported in this paper. Moreover, the variable *PostMerger_i* is only useful in the first stage, in which the price change is estimated. Since we can calculate the price change directly from our dataset, we can exclude *PostMerger_i*.

²² Moreover, our control group is relatively large (387 hospital-insurer combinations), so we do not have the problem that the obtained estimates are imprecise as a consequence of a small control group (see e.g. Tenn, 2008, p. 13).

²³ The variable *PostMerger_i* is only useful in the first stage, in which the price change is estimated. Since we can calculate the price change directly from our dataset, we can exclude *PostMerger_i*.

²⁴ See Monitor Ziekenhuiszorg 2004, Monitor Ziekenhuiszorg 2005, Monitor Ziekenhuiszorg 2006, Monitor Ziekenhuiszorg 2007, by NZa.

²⁵ Independent treatment centers are small outpatient treatment centers that are allowed to enter the market since 1998. These independent treatment centers are only allowed to provide elective (no acute) hospital care (Halbersma et al., 2007).

²⁶ We exclude the year in which the merger took place, since we consider this to be a transition year in which the effect of the merger is not yet correctly measurable (see e.g. Thompson, 2009).

²⁷ We wanted to include the length of the waiting lists as a control variable as well, but this was not possible due to a lack of reliable information.

²⁸ The change of the number of beds may also indicate to what extent the size of hospitals has changed, but this measure only takes into account inpatient cases. Conversely, the change of the number of medical specialists takes into account both inpatient and outpatient cases. Moreover, the number of beds of the hospitals has virtually been constant during the period of our investigation.

²⁹ The major part of the treatments in the competitive segment is outpatient cases.

³⁰ To calculate the HHI's we need to determine the relevant geographical markets. We used the EH-test on patients flows to define the relevant market. For these markets we calculated the market shares of the hospitals. These resulting market shares are used to calculate the HHI's for each geographical market (see also Halbersma, et al. 2007).

³¹ Inspectie voor de Volksgezondheid (www.igz.nl).

³² This quality measure is at the hospital level. There is no measure of quality of hip surgery available for the whole period under investigation.

³³ Only the insurers that have actually insured patients that have undergone hip surgery in one of the merging hospitals in the relevant period are included. Moreover, the numbers of the insurers are randomly assigned.

³⁴ We also performed the regression for both mergers separately. The results are the same, therefore we feel confident to pool the results.

³⁵ The effect of the merger differs per insurer. The results can be found in the Appendix (Table 5). We only include the four insurers for which the equation is statistically significant. Because the ratio observations to number of variables is relatively small, we have to be careful with drawing strong conclusions based on these results.

³⁶ We also performed the analysis per insurer and this provided us with the same picture: the dummy variables are insignificant for all insurers. In other words, for none of the insurers, there is a price increase that can be attributed to the merger.

³⁷ Although the NMa did not define the market exactly.

³⁸ Although patients are not price sensitive, we would expect to find an effect on travel behavior, for instance as a consequence of channeling of patients by insurers.

³⁹ In order to calculate the market shares, we have made use of the definition of the small market that the NMa has made in the original decision.

⁴⁰ See e.g. Roland Berger (2008) and http://www.volkskrant.nl/archief_gratis/article865116.ece/Patient_wisselt_niet_van_ziekenhuis_door_wachtljst

⁴¹ Examples are www.kiesbeter.nl, www.independer.nl and <http://rivm.openrepository.com/rivm/bitstream/10029/16490/1/260101003.pdf> (for hip surgery).

⁴² Monitor Ziekenhuiszorg 2009.

⁴³ Besluit 6424/ Ziekenhuis Walcheren – Oosterscheldeziekenhuizen, 25th March 2009.